

WHAT IS CLAIMED IS:

- 1 1. An initiator explosive for detonating a second explosive comprising:
2 nanocrystalline silicon containing a plurality of pores; and
3 a solid state oxidant disposed within said pores.
- 1 2. The explosive of claim 1 wherein said solid-state oxidant comprises a
2 nitrate salt.
- 1 3. The explosive of claim 3 wherein said nitrate is selected from the group
2 consisting of sodium nitrate, potassium nitrate, ammonium nitrate, magnesium nitrate,
3 calcium nitrate, and gadolinium nitrate.
- 1 4. The explosive of claim 1 wherein said solid-state oxidant comprises a
2 perchlorate salt.
- 1 5. The explosive of claim 4 wherein said perchlorate salt is selected from the
2 group consisting of sodium perchlorate, potassium perchlorate and lithium perchlorate.
- 1 6. The explosive of claim 1 wherein said solid-state oxidant comprises a
2 fluoride salt.
- 1 7. The explosive of claim 6 wherein said fluoride salt is selected from the
2 group consisting of potassium fluoride, potassium hexafluorophosphate, and sodium
3 tetrafluoroborate.
- 1 8. The explosive of claim 1 wherein said solid state oxidant comprises a solid
2 state oxidant selected from the group consisting of PETN, a metal azide, and TNT.

1 9. The explosive of claim 1 wherein said solid-state oxidant is baked into the
2 pores of said porous nanocrystalline silicon.

1 10. The explosive of claim 1 wherein said nanocrystalline silicon comprises a
2 nanowire.

1 11. The explosive of claim 1 wherein said nanocrystalline silicon comprises a thin
2 film.

1 12. The explosive of claim 1 wherein said nanocrystalline silicon comprises a
2 powder.

1 13. A silicon-based chemical sensor device for detecting the presence of a
2 target analyte comprising:
3 a porous nanocrystalline substrate; and
4 gadolinium nitrate.

1 14. A method for detecting a target analyte comprising:
2 providing a porous nanocrystalline substrate;
3 selecting an oxidant;
4 combining the oxidant with the porous nanocrystalline substrate;
5 absorbing a predetermined amount of the target analyte on the porous
6 nanocrystalline substrate;
7 igniting the porous nanocrystalline substrate containing the target analyte
8 and the oxidant; and
9 measuring an emission spectrum for the presence of the target analyte.

1 15. The method of claim 14 further comprising providing a porous
2 nanocrystalline substrate in the form of a thin film.

1 16. The method of claim 14 further comprising selecting a solid-state oxidant.

1 17. The method of claim 14 further comprising selecting the oxidant to be
2 gadolinium nitrate.

1 18. The method of claim 14 further comprising baking the oxidant with the
2 nanocrystalline substrate so that the oxidant is baked into pores of the porous
3 nanocrystalline substrate.

1 19. The method of claim 14 further comprising absorbing from between
2 approximately 1 and 10 micro liters.

1 20. The method of claim 14 further comprising igniting by resistively heating a
2 silicon filament.

1 21. The method of claim 14 further comprising photographing the emission
2 spectra.

1 22. The method of claim 21 further comprising subjecting the photograph to
2 spectrometry analysis.

1 23. The method of claim 14 further comprising absorbing a predetermined
2 amount of a solution containing the target analyte on the porous nanocrystalline substrate.

1 24. The method of claim 14 further comprising absorbing a predetermined
2 amount of ambient gas containing the target analyte on the porous nanocrystalline
3 substrate.

1 25. The method of claim 14 further comprising absorbing a predetermined
2 amount of ambient liquid containing the target analyte on the porous nanocrystalline
3 substrate.

1 26. The method of claim 14 further comprising absorbing a predetermined
2 amount of ambient particulate matter containing the target analyte on the porous
3 nanocrystalline substrate.

1 27. A method for initiating an explosive reaction comprising:
2 creating a bridge wire composed of porous silicon;
3 coupling the bridge wire to an explosive; and
4 heating the bridge wire.

1 28. A propulsion system for a MEMS device comprising:
2 at least one silicon-based explosive unit that includes a solid state oxidant wherein
3 said explosive unit is configured to be a cap.